The rejection of claims 1-4, 9 and 10 under 35 U.S.C. §102(e) over Fleming et al. (U.S. Patent No. 6,358,854, hereinafter "Fleming '854") and Fleming et al. (U.S. Patent No. 5,998,298, hereinafter "Fleming '298") is respectfully traversed. Without acquiescing in the rejection, claim 1 has been amended for clarity. Accordingly, the rejection will be discussed with respect to the claims as amended.

Fleming '854 is directed to a method for fabricating layered material compositions. Fleming '854 discloses a combination of photolithography and chemical-mechanical polishing to permit the direct fabrication of photonic lattices having photonic bandgaps in the 0.1 - 20μ spectral range. In particular, Fleming '854 teaches planarizing each structured layer by chemical-mechanical polishing (see, *e.g.*, Col. 5, linese 20-28). In addition, Fleming '854 makes clear that the mask is stripped *before* further deposition of the material in the trench (see, *e.g.*, Col. 7, lines 10-13, and Figures 2a-2e). As a consequence, Fleming '854 shows that the overgrowth 203 the enters the trenches between the ridges 202 and also covers the ridges 202 because the mask has been removed prior to deposition of material in the trenches. Thus, Fleming '854 has the problem of removing the excess of the overgrowth 203 from the ridges. Fleming '854 teaches removal of this overgrowth using chemical-mechanical polishing.

In complete contrast, the claimed invention specifically recites that the trenches are filled *while the mask is still in place on the ridges*. By depositing the material in the trenches while the mask is still on the ridges, the claimed invention avoids the problem of overgrowth of the trench material onto the ridges. Fleming '854, on the other hand, specifically teaches *removing the mask prior to filling the trenches*, and must therefore,

provide a means for removing overgrowth from the ridges. Fleming '854 teaches that this overgrowth is removed using chemical-mechanical polishing. Thus, not only does Fleming '854 fail to teach or suggest the specifically claimed feature of depositing material in the trenches prior to removing mask material from the ridges, it suffers the additional problem of overgrowth of the trench material onto the ridges. Thus, Fleming '854 fails to achieve one of the numerous advantages of the claimed invention, *i.e.*, preventing overgrowth of the trench material onto the ridges in the first place.

Fleming '298 is similar, in relevant part, to the disclosure of Fleming '854. In particular, Fleming '298, like Fleming '854, teaches stripping the etch mask prior to depositing the second material 24. Fleming '298 is directed to using chemical-mechanical polishing for fabricating photonic bandgap structures. Fleming '298 describes shaped openings 22 with a space material 18. Fleming goes on to state that the etching step is performed completely through layer 20 and that the patterened first material, *after stripping of the etched mask*, forms the spacer material (see, Col. 6, lines 37-57, in particular, lines 52-57). In Figure 3c, Fleming '298 shows the deposited material 24 covering the ridges 18. Fleming '298 then teaches using chemical-mechanical polishing.

Thus, Fleming '298 is similar to Fleming '854 with respect to the removal of the mask material prior to deposition of the further material. This teaching is entirely inapposite to the claimed invention which specifically recites depositing the second material while the mask is still in place. Using the claimed invention provides the advantage of avoiding overgrowth of the material deposited or grown in the trenches onto

the ridges, and therefore avoids the additional steps, such as chemical-mechanical polishing as taught by both Fleming references, required to remove such overgrowth.

It is axiomatic that in order for a reference to anticipate a claim, the reference must disclose, teach or suggest each and every feature of the claimed invention. As set forth above, neither of the Fleming references disclose, teach or suggest each and every feature of the claimed invention. In particular, there is no teaching or suggestion in either Fleming reference of growing or depositing the trench material while the mask is still present on the ridges. Thus, neither Fleming reference can achieve the advantages of the claimed invention, and indeed, both Fleming references suffer from the drawback of having to perform additional steps to remove overgrowth that is not present in the claimed method. Therefore, both Fleming references fail to anticipate the claimed invention. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

The rejection of claims 5-8 under 35 U.S.C. §103(a) over Noda et al (American Inst. of Phys, 1999, hereinafter "Noda") in view of Makino (U.S. Patent No. 6,026,110) is respectfully traversed. It appears from the substance of the rejection that the Office Action is relying on the combination of Noda and Makino with Fleming. Accordingly, the rejection will be discussed as if the rejection is based on Noda and/or Makino in combination with either of the Fleming references discussed above.

It is respectfully submitted that neither Noda nor Makino overcome the fundamental deficiencies noted above with respect to the Fleming references. In particular, there is no teaching in either Noda or Makino of depositing or growing

material in the trench while the mask is still present on the ridge. Thus, the combination of either or both Fleming references with Noda and/or Makino would result in the same disadvantages noted above, namely, overgrowth of the second material on the ridges, requiring further steps for removal. Therefore, even if, *arguendo*, the combination of Noda, Makino and the Fleming references were proper, the combination nevertheless fails to render the claimed invention obvious. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

In view of the foregoing, it is respectfully submitted that the entire application is in condition for allowance. Favorable reconsideration of the application and prompt allowance of the claims are earnestly solicited.

Should the Examiner deem that further issues require resolution prior to allowance, the Examiner is invited to contact the undersigned attorney of record at the telephone number set forth below.

Respectfully submitted,
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MARKED-UP VERSION OF AMENDED CLAIM

1. (Amended) A method of making a photonic band gap material, the method comprising [the steps of]:

(a) growing an epitaxial layer of a first semiconductor material onto a substrate;

(b) applying a mask to selected areas of the first semiconductor material and etching away the non-masked areas of the first semiconductor material to form a plurality of recesses;

(c) selectively growing an epitaxial layer of a second semiconductor material, while the mask applied in step (b) is still in place, to fill the plurality of recesses created by the etching of the first semiconductor material;

[characterised in that the method comprises the further steps of:]

(d) growing a further epitaxial layer of the first semiconductor material over the first semiconductor material and the second semiconductor material;

(e) applying a mask to selected areas of the further epitaxial layer of the first semiconductor material and etching away the non-masked areas of the further epitaxial layer of the first semiconductor material to form a further plurality of recesses, said further plurality of recesses being rotationally displaced with [regard] respect to the plurality of recesses formed within the preceding layer of the first semiconductor material;

(f) selectively growing a further plurality of epitaxial layers of the second semiconductor material, after the mask applied in step (b) is removed, to fill the recesses created by the etching of the first semiconductor material; and

(g) repeating steps (d), (e), and (f) as required to form a semiconductor product having a plurality of layers of interleaved regions of the first semiconductor material and the second semiconductor material, the regions in each of the layers being rotationally displaced with [regard] respect to the regions in the adjacent layers.